CHAPTER IV F

Gray Lodge Wildlife Management Area Alternative Plans

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
MID-PACIFIC REGION

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CHAPTER IV F

GRAY LODGE WILDLIFE MANAGEMENT AREA PLAN

In 1931 the State Division of Fish and Game purchased the 2,540-acre Gray Lodge Gun Club to establish the first Sacramento Valley wildlife refuge. The club was purchased with Governor's Conservation Fund monies. In 1971, the refuge area was increased to 8,400 acres under the authority of the cooperative State and Federal Pittman-Robertson Federal Aid to Wildlife Restoration Act which provides funds to acquire and develop wetlands. The Gray Lodge Wildlife Management Area (Refuge) is located within an intensively developed agricultural farming area in Sutter and Butte Counties about 10 miles southwest of Gridley. The Refuge is located adjacent to the Butte Sink which is an overflow area of Butte Creek and the Sacramento River.

Butte Basin extends from the City of Red Bluff in the north to Butte and Morrison Sloughs and Sutter Buttes in the south. The Butte Basin is bounded by the Sacramento River on the west and the Feather River on the east. Part of the Butte Sink still remains comparatively unchanged from its original condition, although water developments have reduced flooding. Water for wetlands in the Butte Sink is derived from flood waters, Butte Creek, Sacramento River, and agricultural return flows from rice fields. During wet winters, Butte Basin flood waters flow into the Sutter Bypass flood control area and then into the Sacramento River, or directly into the Sacramento River. Within the Butte Basin, 67 organized hunting clubs maintain over 52,000 acres of habitat including over 22,000 acres of flooded lands. The Butte Sink frequently contains more than one million ducks and thousands of geese, although normal waterfowl populations are about 550,000.

The Refuge consists of marshlands, ponds, wheat fields, and uplands. The wetlands support sources of waterfowl food such as swamp timothy and invertebrate populations. The upland areas of the Refuge provide habitat for geese, upland birds, and other wildlife species. The Refuge is managed by the DFG.

A. WATER RESOURCES

The Refuge receives 8,000 acre-feet of dependable water from the Biggs-West Gridley Irrigation District (BWGID) and Reclamation Districts 833 and 2054. Over 40 percent of water supply is from wells.

1. Surface Waters

Approximately 2,600 acres of the Refuge is located within the BWGID. The BWGID is a member of the Sutter-Butte Joint Water District which owns and operates the Sutter-Butte Canal that conveys water from

Thermalito Afterbay. During some years, the BWGID does not receive adequate water supplies and must purchase water from other districts. The BWGID has allocated 12,000 acre-feet of water per year to the Refuge. However, only 8,000 acre-feet is available during the irrigation season from April to November. The Refuge turnouts are located at the end of the BWGID system and therefore, cannot receive water following dewatering of the BWGID canals in November. Improvements of the BWGID canals, Sutter-Butte Canal, and the Reclamation District drainage system would be needed to maintain year-round water supplies.

The Refuge also diverts water from the Reclamation District 833 Drain and Reclamation District 2054 Drain. These canals convey agricultural return flows. The return flows are only available during the summer and early fall when the rice fields are drained. The Reclamation Districts do not use or claim the agricultural return flows which are diverted by the Refuge under appropriative rights. Based upon existing data, water quality appears to be adequate for refuge management.

Additional water potentially may be obtained from Thermalito Afterbay and conveyed through BWGID facilities, the Cherokee Canal, or Western Canal Water Users Association (WCWUA) facilities. The Cherokee Canal, an old mining drainage channel, is operated by Richvale Irrigation District, a member of the Sutter-Butte Joint Water District. Water from the Cherokee Canal could be diverted to BWGID for delivery to the Refuge. The WCWUA facilities divert water from Thermalito Afterbay and are operated year-round to deliver water to hunting clubs in the Butte Sink.

2. Water Conveyance Facilities

The BWGID delivers water to the Refuge through four supply ditches: Rising River Ditch, Cassidy Ditch, Justeson Ditch, and Lateral C, as shown in Figure IV F-1. Water flows by gravity onto the Refuge from the Rising River, Cassidy, and Justeson Ditches and is available from April to November. Water from Lateral C is diverted into a ditch on the western portion of the Refuge and is pumped onto the Refuge. Lateral C is operated year-round.

Water can be diverted year-round from the Reclamation District 833 Drain through the Refuge. However, water may not be available in the 833 Drain after rice fields are drained in the fall. Water is available by gravity flow from the 2054 Drain from April to November.

The Refuge internal conveyance system is in good condition and only requires minor improvements. The improvements would reduce energy costs by diverting water onto the Refuge at the highest elevations and allowing distribution by gravity flow or low-lift pumps.

3. Groundwater

The Refuge is located on the Butte Creek floodplain and uplands. The area is underlain by fine grained materials with sand lenses which may be part of or derived from the Tuscan Formation. The groundwater is located within 100 feet of the ground surface. Based upon existing data, the quality appears to be suitable for irrigation and waterfowl needs. The safe yield of the aquifer under the Refuge based upon operational records has been estimated to be 12,000 acre-feet.

B. FORMULATION & EVALUATION OF ALTERNATIVE PLANS

The DFG estimates that 44,000 acre-feet of water would be required for full development and optimum management of the entire Refuge. For the purposes of assessing the impacts of water supply alternatives, four levels of water supply have been identified, as presented in Table IV F-1. Each of the water supply levels provide a different volume of water, and are summarized as follows:

Level 1 - Existing firm water supply

Level 2 - Current average annual water deliveries

Level 3 - Water supply needed for full use of existing development

Level 4 - Water delivery needed for optimum management

1. Delivery Alternative for Level 1 (No Action Alternative) (8,000 acre-feet)

The existing facilities are adequate to deliver 8,000 acre-feet of water from BWGID. This 8,000 acre-feet of water is the maximum amount available to the Refuge on a dependable basis. If the agricultural return flows are reduced in the future, this amount could be reduced.

2. Delivery Alternatives for Level 2 (35,400 acre-feet)

The following alternatives would improve water conveyance facilities, reduce the reliance on groundwater, improve the quality of circulated water, and increase the reliability of winter water supplies. All of the alternatives were developed to provide both winter and summer water. Alternatives 2A, 2B, and 2C assume that water can be obtained from Thermalito Afterbay. This would require a long-term agreement between Reclamation and DWR to exchange CVP water for water from Thermalito Afterbay. Because the Refuge has existing wells, additional wells would not need to be constructed to implement a conjunctive use program.

TABLE IV F-1

DEPENDABLE WATER SUPPLY NEEDS

ALTERNATIVE SUPPLY LEVELS FOR THE GRAY LODGE WMA

Month	Supply Level 1 ac-ft	Supply Level 2 ac-ft	Supply Level 3 ac-ft	Supply Level 4 ac-ft
January	240	1,050	1,230	1,320
February	240	1,050	1,230	1,320
March	240	1,050	1,230	1,320
April	240	1,050	1,230	1,320
May	560	2,500	2,870	3,080
June	800	3,500	4,100	4,400
July	560	2,500	2,870	3,080
August	640	2,850	3,280	3,520
September	1,600	7,100	8,200	8,800
October	1,520	6,750	7,790	8,360
November	1,040	4,600	5,330	5,720
December	320	1,400	1,640	1,760
Total	8,000	35,400	41,000	44,000

Notes:

Supply Level 1: Existing firm water supply
Supply Level 2: Current average annual water deliveries
Supply Level 3: Full use of existing development
Supply Level 4: Optimum management

Source: USBR, 1986a

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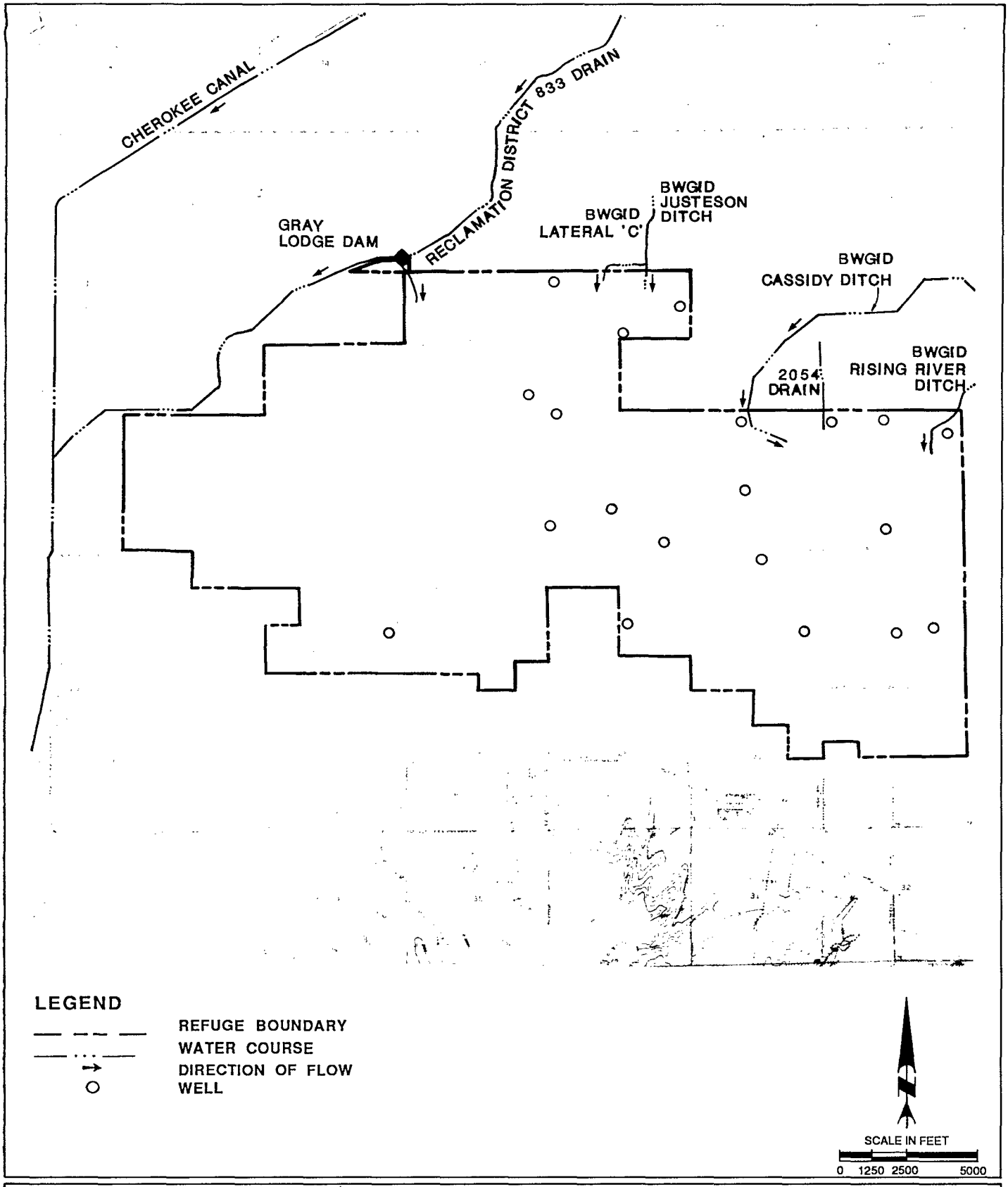

FIGURE IV F-1

GRAY LODGE WILDLIFE MANAGEMENT AREA

EXISTING WATER SUPPLY FACILITIES

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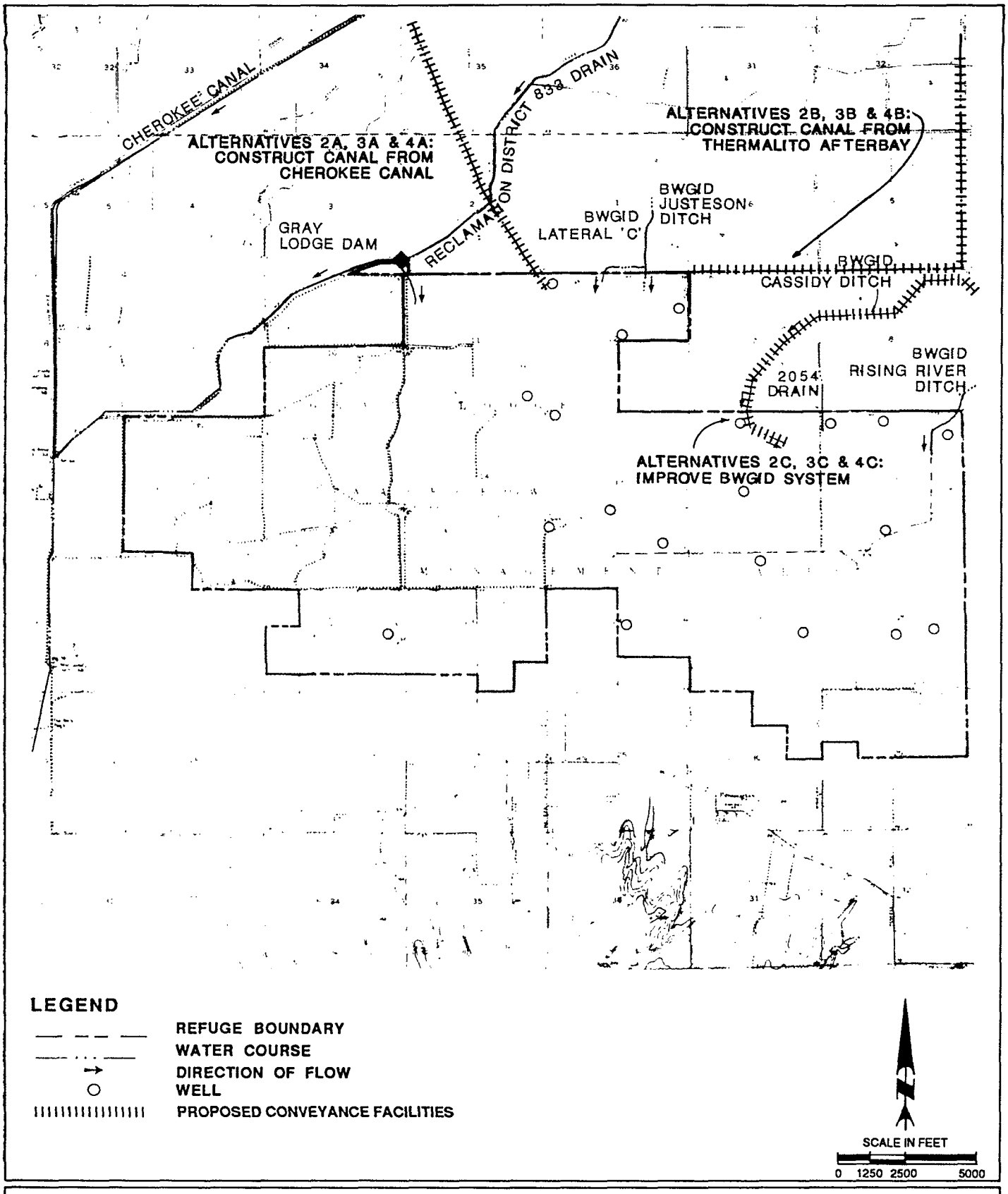

FIGURE IV F-2

GRAY LODGE WILDLIFE MANAGEMENT AREA

ALTERNATIVE WATER SUPPLY FACILITIES

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Alternative 2A - Construct Ditch from Cherokee Canal. To deliver water from Cherokee Canal to the Refuge, an 11,000-foot ditch would be constructed from the Cherokee Canal to the Refuge, as shown in Figure IV F-2. Water would be delivered from the Thermolito Afterbay by Richvale Irrigation District to the Cherokee Canal. Due to the location of the Cherokee Canal, the water would be delivered to the lowest elevation on the Refuge and would require pumping to distribute water on the Refuge.

Alternative 2B - Construct Canal from Thermolito Afterbay. A canal would be constructed from Thermalito Afterbay to the Refuge. The 63,360-foot canal would include siphons under State Highway 99, Southern Pacific Railroad tracks, and at four local roads.

Alternative 2C - Improve Biggs-West Gridley Irrigation District System. BWGID cannot deliver water to the Refuge in the winter due to maintenance on the canals. This plan was developed so that improvements would be completed on portions of the BWGID conveyance system which would reduce the need to dewater the canals. The improvements would include construction of a larger culvert at Evans Reimer Road to increase the capacity of the Cassidy Ditch from 25 cfs to over 60 cfs, as well as other improvements to 4,750 feet of the Cassidy Ditch. This alternative would require implementation of Alternative 2A or 2B.

Alternative 2D - Implement a Conjunctive Use Plan. Existing wells would be used to deliver the maximum month water demand. The wells would be operated as part of a conjunctive use program. During dry years, water demands would be supplied by wells, as discussed in Chapter III. During wet years, the wells would probably not be needed if CVP exchange water is provided. Implementation of this alternative also would require implementation of Alternative 2A, 2B, or 2C.

3. Delivery Alternatives for Level 3 (41,000 acre-feet)

Water deliveries under Level 3 are similar to the Level 2 deliveries. The same alternatives considered for Level 2 were evaluated for Level 3.

Alternative 3A - Construct Ditch from Cherokee Canal. This alternative is identical to Alternative 2A.

Alternative 3B - Construct Canal from Thermolito Afterbay. This alternative is identical to Alternative 2B.

Alternative 3C - Improve Biggs-West Gridley Irrigation District System. This alternative is identical to Alternative 2C. This alternative would require implementation of Alternative 3A or 3B.

Alternative 3D - Implement a Conjunctive Use Plan. Existing wells would be used to deliver the maximum month water demand. This alternative is identical to Alternative 2D. Implementation of this

alternative also would require implementation of Alternative 3A, 3B, or 3C.

4. Delivery Alternatives for Level 4 (44,000 acre-feet)

Under Level 4, a portion of the uplands would be flooded to improve refuge management. However, the water supply alternatives proposed under Levels 2 and 3 would be adequate to provide water supplies under Level 4. Therefore, the alternatives for Level 4 would be the same as for Levels 2 or 3.

Alternative 4A - Construct Ditch from Cherokee Canal. This alternative is identical to Alternative 2A.

Alternative 4B - Construct Canal from Thermolito Afterbay. This alternative is identical to Alternative 2B.

Alternative 4C - Improve Biggs-West Gridley Irrigation District System. This alternative is identical to Alternative 2C. This alternative would require implementation of Alternative 4A or 4B.

Alternative 4D - Implement a Conjunctive Use Plan. Existing wells would be used to deliver the maximum month water demand. This alternative is identical to Alternative 2D. Implementation of this alternative also would require implementation of Alternative 4A, 4B, or 4C.

5. Summary of Alternatives

The beneficial and adverse effects of each alternative were compared with respect to the criteria listed in Chapter III.

There are no alternatives for Level 1.

Alternatives 2A, 3A, and 4A would require long-term agreements with Richvale Irrigation District. Alternatives 2C, 3C, and 4C would require long-term conveyance agreements with BWGID to transport additional water to the Refuge. Alternatives 2B, 3B, and 4B may be difficult to implement due to the need to aquire easements along the 12-mile alignment.

Alternatives 2C, 3C, and 4C would require implementation of Alternatives 2A or 2B, 3A or 3B, and 4A or 4B, respectively, to provide summer water supplies.

Alternatives 2D, 3D, and 4D may result in overdraft conditions because the amount of water needed would exceed the safe yield of the Refuge. These alternatives would require implementation of surface water alternatives (Alternatives 2A, 2B, or 2C; Alternatives 3A, 3B, or 3C; and Alternatives 4A, 4B, or 4C) to provide water during wet years.

C. COSTS & ECONOMIC ANALYSIS

Costs for the alternative plans to provide adequate water supplies under Levels 2, 3, and 4 are presented in Table IV F-2. The construction costs include factors to cover engineering, contingencies, and overhead. Annual operation and maintenance (O&M) costs include only the local cost of delivering water. The annual O&M costs do not include costs to purchase CVP exchange water. During the advanced planning phase, these costs will be refined further. The costs do not include the costs to provide water under Level 1.

Construction of the facilities under the alternative plans would result in additional money being spent in the economy of Sutter and Butte Counties during construction. The construction could be completed within one summer season by construction workers who reside within the area.

Currently, the annual public use (Level 2) at the Refuge is about 165,200 visits per year. If additional water is provided, the public use levels are anticipated to increase.

D. WILDLIFE RESOURCES

The average annual bird use on the Refuge is over 58,300,000. Butte Basin is one of the most important wintering areas for the endangered Aleutian Canada goose. Wildlife and fishery resources associated with the Refuge are presented in Table IV F-3. The only federally listed threatened and endangered species associated with the Refuge are the Aleutian Canada goose, Branta canadensis Leucopareia and the Valley elderberry longhorn beetle, Desmocerus californicus dimorphus. Candidate threatened and endangered species associated with the Refuge include the white-faced ibis, Plegadis chichi; tricolored blackbird, Agelaius tricolor; Sacramento anthicid beetle, Anthicus Sacramento; and California hibiscus, Hibiscus californicus, as listed in Table IV F-4.

Implementation of alternative plans probably would not adversely affect the listed and candidate threatened and endangered species of wildlife. The improved habitat would increase the number of public-use days, as indicated in Table IV F-5. Detailed field investigations will be completed during the advanced planning phase of the project. Implementation of the plan would result in overall beneficial environmental effects. The No Action Alternative could result in the loss of habitat and associated recreational benefits. Additional regional environmental analyses will be completed as part of the Water Contracting EIS's.

TABLE IV F-2

SUMMARY OF ESTIMATED COSTS OF ALTERNATIVES

GRAY LODGE WMA

	Alternatives					
	2A	2B	2C	2D	3A	3B
Additional Water (ac-ft)	27,400	27,400	27,400	27,400	33,000	33,000
Construction Costs						
Wells	$ --	$ --	$ --	$ --	$ --	$ --
Pipelines/Canals	59,500(a)	948,300(c)	34,000(d)	--	59,500(a)	948,300(c)
Pump Station	216,000(b)	--	--	--	216,000(b)	--
Subtotal	$275,500	$948,300	$ 34,000	$ --	$275,500	$948,300
Other Costs	--	--	275,500(e)	275,500(f)	--	--
Total (g)	$275,500	$948,300	$309,500	$275,500	$275,500	$948,300
Annualized Construction Costs (8.87%, 30 yrs)	$ 26,500	$ 91,230	$ 29,780	$ 26,500	$ 26,500	$ 91,230
Additional Annual Costs						
Operation & Maintenance(h)	$ 4,200	$ 18,500	$ 1,100	$ 37,000	$ 4,200	$ 18,500
Power	41,100(i)	--	--	130,150(j,k)	49,500(i)	--
Local Conveyance Cost(l)	49,320	--	--(m)	--	59,400	--
Subtotal	$ 94,620	$ 18,500	$ 1,100	$167,150	$113,100	$ 18,500
Other Costs	--	--	94,620(e)	47,310(f,k)	--	--
Total (g)	$ 94,620	$ 18,500	$ 95,720	$214,460	$113,100	$ 18,500
Total Annual Cost	$121,120	$109,730	$125,500	$240,960	$139,600	$109,730
Cost/Additional Acre-Foot	$ 4.40	$ 4.00	4.60	$ 8.80	$ 4.20	$ 3.30

TABLE IV F-2

SUMMARY OF ESTIMATED COSTS OF ALTERNATIVES

GRAY LODGE WMA

(Continued)

	Alternatives					
	3C	3D	4A	4B	4C	4D
Additional Water (ac-ft)	33,000	33,000	36,000	36,000	36,000	36,000
Construction Costs						
Wells	$ --	$ --	$ --	$ --	$ --	$ --
Pipelines/Canals	34,000(d)	--	59,500(a)	948,300(c)	34,000(d)	--
Pump Station	--	--	216,000(b)	--	--	--
Subtotal	$ 34,000	$ --	$275,500	$948,300	$ 34,000	$ --
Other Costs	275,000(e)	275,500(f)	--	--	275,000(e)	275,500(f)
Total (g)	$309,000	$275,500	$275,500	$948,300	$309,000	$275,500
Annualized Construction Costs (8.87%, 30 yrs)	$ 29,750	$ 26,500	$ 26,500	$ 91,230	$ 29,730	$ 26,500
Additional Annual Costs						
Operation & Maintenance	$ 1,100	$ 37,000	$ 4,200	$ 18,500	$ 1,100	$ 37,000
Power	--	156,750(i,j)	54,000(h)	--	--	171,000(i,j)
Local Conveyance Cost(k)	--(l)	--	64,800	--	--(l)	--
Subtotal	$ 1,100	$193,750	$123,000	$ 18,500	$ 1,100	$208,000
Other Costs	113,100(e)	56,550(f,j)	--	--	123,000(e)	61,500(f,j)
Total (g)	$114,200	$250,300	$123,000	$ 18,500	$124,100	$269,500
Total Annual Cost	$143,950	$276,800	$149,500	$109,730	$153,830	$296,000
Cost/Additional Acre-Foot	$ 4.40	$ 8.40	$ 4.20	$ 3.10	$ 4.30	$ 8.20

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TABLE IV F-2

SUMMARY OF ESTIMATED COSTS OF ALTERNATIVES

GRAY LODGE WMA

(Continued)

Notes: Alternatives 2A, 3A, and 4A: Construct Ditch from Cherokee Canal.
Alternatives 2B, 3B, and 4B: Construct Canal from Thermalito Afterbay.
Alternatives 2C, 3C, and 4C: Improve Biggs-West Gridley Irrigation District System.
Alternatives 2D, 3D, and 4D: Implement a Conjunctive Use Plan.

(a) 11,000-foot, 36 cfs unlined canal; three 80-ft siphons.

(b) 36 cfs, 20-foot lift pump station.

(c) 63,360-foot, 140 cfs unlined canal; seven 80-ft siphons.

(d) 4,750-foot, 60 cfs unlined canal; 66-inch diameter crossing.

(e) Alternative 2C assumes implementation of 2A, Alternative 3C assumes implementation of 3A, Alternative 4C assumes implementation of 4A.

(f) Alternative 2D assumes implementation of 2A, Alternative 3D assumes implementation of 3A, Alternative 4D assumes implementation of 4A.

(g) The cost for Water Supply Level 1 is not included.

(h) Basis for O&M cost are discussed in Appendix F.

(i) Unit Pumping Cost = $1.50/af.

(j) Unit Pumping Cost = $9.50/af.

(k) Values multiplied by 0.5 because facilities are assumed to be used only 5 out of 10 years.

(l) Unit Conveyance Cost = $1.80/af.

(m) Cost included with conveyance costs for Alternatives 2A, 3A, or 4A, respectively.

TABLE IV F-3

FISH AND WILDLIFE RESOURCES

GRAY LODGE WMA

Ducks

Hooded Merganser
Mallard[a]
Canvasback
European Wigeon
American Wigeon
Common Merganser
Green-winged Teal
Cinnamon Teal[a]
Blue-winged Teal
Northern Shoveler
Wood Duck[a]
Gadwall[a]
Pintail[a]
Redhead[a]
Scaup
Ring-necked Duck
Common Goldeneye
Bufflhead
Ruddy Duck[a]
Red-breasted Merganser

Geese and Swans

Ross' Goose
Cackling Canada Goose
Tundra Swan
Snow Goose
Canada Goose
White-fronted Goose
Lesser Canada Goose

Coots

American Coot[a]

Shore and Wading Birds

Common Gallinule[a]
Great Blue Heron[a]
Great (Common) Egret[a]
American Avocet[a]
Green-backed Heron[a]
Common Snipe
Black-necked Stilt[a]
Snowy Egret[a]

Upland Game

Ring-necked Pheasant
Jackrabbit
Dove
Cottontail

TABLE IV F-3

FISH AND WILDLIFE RESOURCES

GRAY LODGE WMA
(Continued)

Raptorial Birds		
American Kestrel[a]	Northern Harrier[a]	Screech Owl[a]
Great Horned Owl[a]	Burrowing Owl[a]	Black-shouldered Kite[a]
Red-tailed Hawk[a]	Turkey Vulture	Golden Eagle
Fish		
Largemouth Bass	Catfish	
Carp	Pan Fish	
Furbearers		
Opossum	Raccoon	Coyote
Mink	Beaver	Skunk
Muskrat		
Others		
Mule Deer		

Notes:

(a) Birds nesting on refuge

Source: Environmental Assessment Reports, Gray Lodge Wildlife Area, and Refuge records

TABLE IV F-4

FEDERALLY LISTED, PROPOSED, & CANDIDATE THREATENED & ENDANGERED SPECIES

GRAY LODGE WMA

Listed Species

Invertebrates

Valley elderberry longhorn beetle, Desmocerus californicus dimorphus (T)

Proposed Species

None

Candidate Species

Birds

White-faced ibis, Plegadis chihi (2)
Tricolored blackbird, Agelaius tricolor (2)

Invertebrates

Sacramento anthicid beetle, Anthicus sacramento (2)

Plants

California hibiscus, Hibiscus californicus (2)

Source: USFWS, June 4, 1987

(E)—Endangered (T)—Threatened (CH)—Critical Habitat

(1)—Category 1: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened.

(2)—Category 2: Taxa for which existing information indicated may warrant listing, but for which substantial biological information to support a proposed rule is lacking.

TABLE IV F-5

WILDLIFE RECREATIONAL BENEFITS AND RESOURCE IMPACTS

GRAY LODGE WMA

	No Action Alternative	Alternatives 2A	2B	2C	2D	3A	3B	3C	3D	4A	4B	4C	4D
Habitat Acres													
Permanent Pond	0	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,700	2,700	2,700	2,700
Native Marsh	2,600	3,800	3,800	3,800	3,800	3,800	3,800	3,800	3,800	3,800	3,800	3,800	3,800
Cereal Grains	300	300	300	300	300	300	300	300	300	300	300	300	300
Upland	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,200	1,200	1,200	1,200
Administration	400	400	400	400	400	400	400	400	400	400	400	400	400
Bird Use Days													
Ducks and Geese	13,100,000	57,100,000	57,100,000	57,100,000	57,100,000	66,200,000	66,200,000	66,200,000	66,200,000	70,800,000	70,800,000	70,800,000	70,800,000
Other Waterbirds	300,000	1,200,000	1,200,000	1,200,000	1,200,000	1,400,000	1,400,000	1,400,000	1,400,000	1,500,000	1,500,000	1,500,000	1,500,000
Total	13,400,000	58,300,000	58,300,000	58,300,000	58,300,000	67,600,000	67,600,000	67,600,000	67,600,000	72,300,000	72,300,000	72,300,000	72,300,000
Public Use Days													
Consumptive	20,800	29,800	29,800	29,800	29,800	31,100	31,100	31,100	31,100	32,500	32,500	32,500	32,500
Non-Consumptive	83,300	135,400	135,400	135,400	135,400	157,000	157,000	157,000	157,000	168,000	168,000	168,000	168,000
Total	104,100	165,200	165,200	165,200	165,200	188,100	188,100	188,100	188,100	200,500	200,500	200,500	200,500
Total Annual Cost	-	$ 121,120	$ 109,730	$ 125,500	$ 240,960	$ 139,600	$ 109,730	$ 143,950	$ 276,800	$ 149,500	$ 109,730	$ 153,830	$ 296,000
Incremental Cost/Additional 1000 Bird Use Days	N/A	$ 2.70	$ 2.50	$ 2.80	$ 5.40	$ 2.60	$ 2.00	$ 2.70	$ 5.10	$ 2.50	$ 1.90	$ 2.60	$ 5.00
Incremental Cost/Additional Public Use Day	N/A	$ 2.00	$ 1.80	$ 2.10	$ 4.00	$ 1.70	1.30	1.70	$ 3.30	$ 1.60	$ 1.20	$ 1.60	$ 3.10

Notes: Alternatives 2A, 3A, and 4A: Construct Ditch from Cherokee Canal.
Alternatives 2B, 3B, and 4B: Construct Canal from Thermalito Afterbay.
Alternatives 2C, 3C, and 4C: Improve Biggs-West Gridley Irrigation District System.
Alternatives 2D, 3D, and 4D: Implement a Conjunctive Use Plan.

E. SOCIAL ANALYSIS

The social consequences of operating the facilities of the selected plans would be positive due to the potential increase in public use.

F. POWER ANALYSIS

The Pacific Gas & Electric Company serves the Refuge under the PA-1 rate schedule for agricultural users. The power is used for the wells and on-refuge conveyance system pumps. Timers have been installed on many pumps to increase the use of off-peak pump operations.

A facility must be an authorized function of the CVP to receive project-use power. The authority to deliver the CVP project-use power to the Refuge is currently being examined and will be detailed in the Refuge Water Supply Planning Report. A more detailed discussion of project-use power and wheeling agreements is provided in Chapter II.

G. PERMITS

Construction of the facilities would require several permits. Butte County would issue approvals for construction of the new canals to ensure that existing drainage facilities would not be adversely affected. Construction under Alternatives 2B, 3B, 4B, 2C, 3C, and 4C may require a Stream Alteration Permit from DFG and a Corps of Engineers permit for construction in wetlands or riparian corridors. Alternatives 2B, 3B, and 4B also would require permits from CalTrans to cross State Highway 99, from Butte County to cross local roads, and from Southern Pacific Railroad to cross the railroad property.